P.O. 13290

ASCO laboratory

1979 SOUTH RITCHEY • SANTA ANA, CALIFORNIA 92705 • (714) 541-6629

7620.1
(Test Number)

STANDARDS LAB CALIBRATION REPORT

This report is to certify that this instrument has been calibrated within the tolerance stated by the manufacturer unless otherwise stated. Standards used are traceable to the National Bureau of Standards and certifications are on file, in accordance with MIL-STD-45662A.

VOLTS: _____ CAPACITANCE: _____ RESISTANCE: _____

EQUIPMENT PARTICULARS

Customer: Parko Electronics
Equipment: Gen-Rad Frequency Counter
Model Number: 1192
Serial Number: 00745
I.D. Number: TE-1113-1
Test Date: 6-6-83
Due Date: 6-6-84

RECEIVED CONDITION

- ☐ Non Operational
- ☐ Within Tolerance
- ☐ Out of Tolerance
- ☒ Operational Defect
- ☐ Physical Damage

REMARKS: Repair: Reads '9s' on LSD under all conditions and various segments are missing ?

WORK PERFORMED

- ☐ Performance Check
- ☒ Calibrated to Mfg. Spec.
- ☐ Calibrated to _____%
- ☐ Certified-Mechanical Only
- ☒ Repair – See Remarks

REMARKS: Reseated IC's and NIXIES, corrected the problem, calibrated. Ordered 7 each new NIXIES, will ship when received.

NOTE: Data Available

TEST CONDITIONS & STANDARDS

Temperature: 70 F
Humidity: 48 %
Technician: 27
Approved by: JWB

Standards Used	Model No.	ID No.	Recalibrate Due Date
Freq. Counter	9919	79-1	9-18-83
Time Mark Gen	184	79-4	7-30-83

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SOLD TO. PARKO ELECTRONICS
16722 MILLIKEN AVENUE
IRVINE, CA 92714
ATTN: ACCTS.PAYABLE

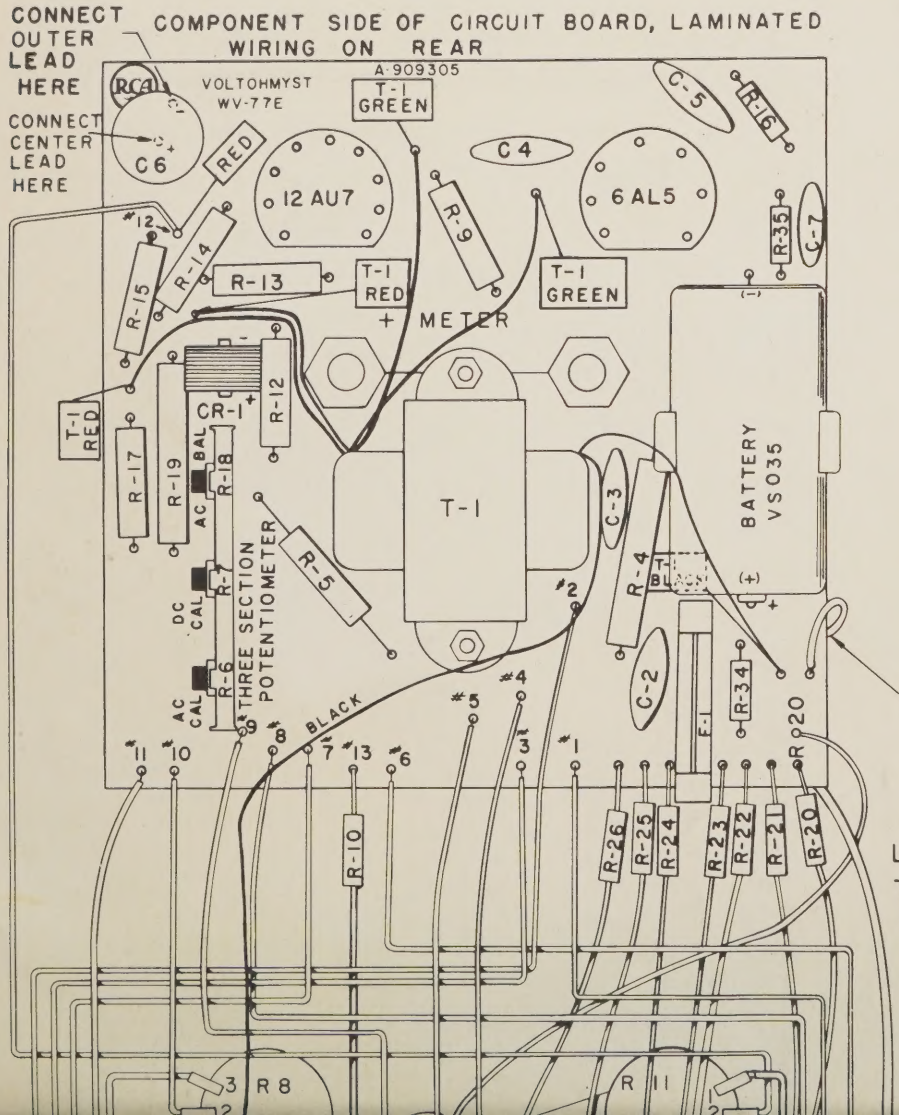
SHIP TO.

DATE ENTERED	DATE SHIPPED/INV.	CUSTOMER ORDER NO.	NET	INVOICE NO.
5-25-83	6-7-83	13290	30 Days	4713

ITEM	MODEL NUMBER	DESCRIPTION	QUANTITY SHIPPED	AMOUNT
1	1192 W/Manual	GEN-RAD, FREQUENCY COUNTER, S/N 00745, ID# TE-1113-1	1	
		CALIBRATION		$ 53.00
		REPAIR/SERVICE		$ 25.00
		PARTS		$141.75
		TAX		$ 8.51
		PLEASE PAY THIS AMOUNT		$228.26

RECEIVED JUN 8 1983

INVOICE CUSTOMER #1

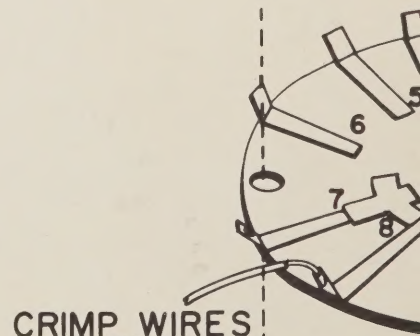


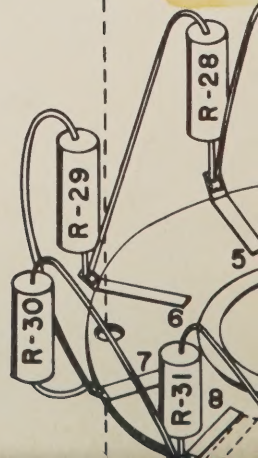
DETAIL "A"

LINE CORD TIED TO SPACER AS SHOWN.

FIGURE 1.

ASSEM





ASSEMBLY INSTRUCTIONS FOR RCA VOLTOHMYST® KIT WV-77E(K)

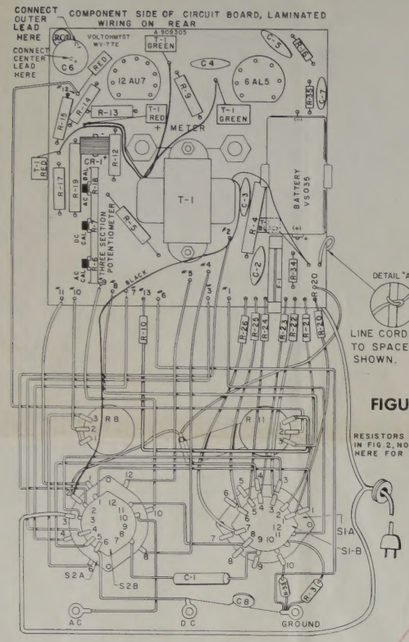


FIGURE 1.

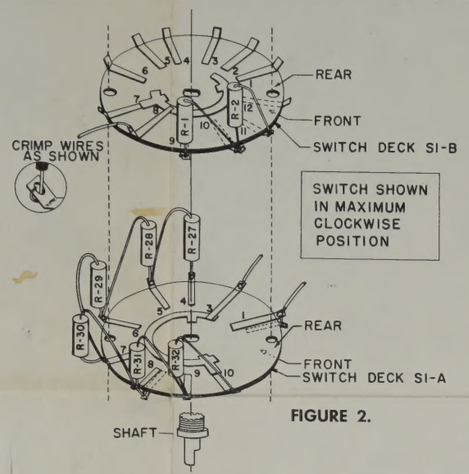
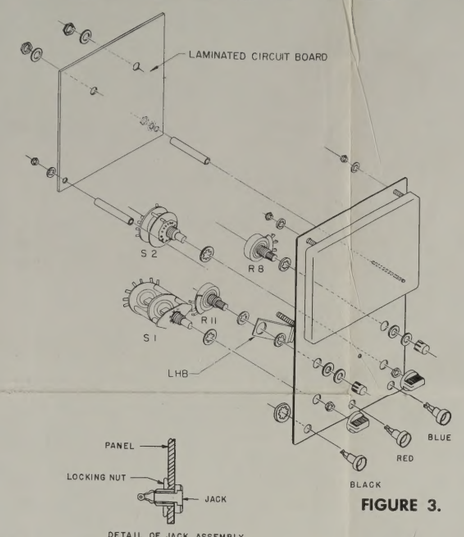
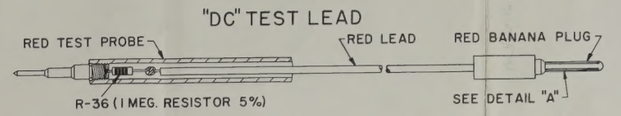


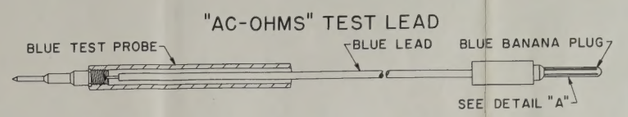
FIGURE 2.



DETAIL OF JACK ASSEMBLY

FIGURE 3.





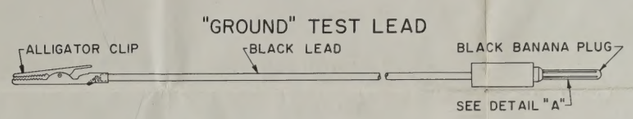


FIGURE 4.

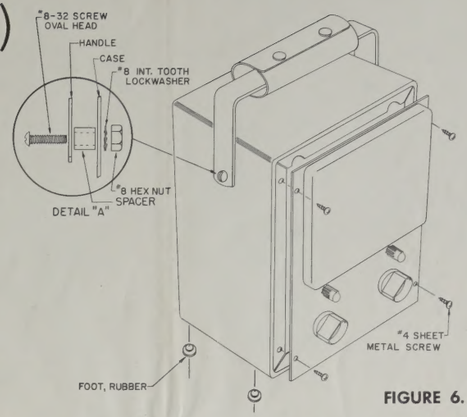


FIGURE 6.

BEFORE PROCEEDING, READ INTRODUCTORY INSTRUCTION PAMPHLET

Step A Preparing hookup wire

1 (✓) Cut one 10 inch wire lead from the supplied hookup wire

2 (✓) Cut six 5 inch wire leads from the supplied hookup wire

3 (✓) Cut eight 4 inch wire leads from the supplied hookup wire

4 (✓) Cut four 3 inch wire leads from the supplied hookup wire

5 (✓) Cut two 1 inch wire leads from the supplied hookup wire

6 (✓) Strip the insulation approximately ¾" from each end

Step B Subassembly of the Laminated Circuit Board (Fig. #1)

Orientate the laminated circuit board (with copper side down) as shown in Figure #1.

(S) means solder

(NS) means do not solder.

NOTE: If excess sealant paint extends on resistor or capacitor leads, carefully scrape leads clean with a knife to body of component.

1 (✓) Insert R-17 (27K ohms 5% red—violet—orange—gold) as shown. Bend leads at right angles to the resistor body, and insert the leads into the holes marked "R-17" on the laminated circuit board. The resistor body is to be flat with the laminated circuit board. Turn the laminated circuit board over and solder the leads to the copper foil. Clip off the excess lead wire to about ⅛" above the copper foil. Use this method for installing the other resistors on this assembly, unless special instructions are given. Color coding will be given for every resistor that may be so marked, but some of the resistors supplied may be marked in letters and numerals instead of with color band.

2 (✓) Insert R-19 (47K ohms 5% yellow—violet—orange—gold) (S)

3 (✓) Insert R-15 (15K ohms 5% brown—green—orange—gold) (S)

4 (✓) Insert R-13 (330 ohms 5% orange—orange—brown—gold) (S)

5 (✓) Insert R-14 (330 ohms 5% orange—orange—brown—gold) (S)

6 (✓) Insert R-5 (91 megohms 20% white—brown—blue) (S)

7 (✓) Insert R-12 (10K ohms 5% brown—black—orange—gold) (S)

8 (✓) Insert R-4 (20 megohms 5% red—black—blue—gold) (S)

9 (✓) Insert R-9 (3.3 megohms 10% orange—orange—green—silver) (S)

10 (✓) Insert R-16 (6.8 megohms 10% blue—gray—green—silver) (S)

11 (✓) Insert R-35 (1 megohm 10% brown—black—green—silver) (S)

12 (✓) Insert R-34 (220K ohms 20% red—red—yellow) (S)

13 (✓) Insert C-4 (.005 disc capacitor) into the holes on the laminated circuit board marked "C-4". The disc capacitor should be perpendicular to the laminated circuit board (S). Clip off excess leads (if any) to about ⅛" above the copper foil. Use this method for installing the other disc capacitors on this assembly, unless special instructions are given.

14 (✓) Insert C-5 (.005 μFD disc capacitor) (S)

15 (✓) Insert C-7 (.001 μFD) (S)

16 (✓) Insert C-3 (.02 μFD) (S)

17 (✓) Insert C-2 (.02 μFD) (S)

18 (✓) Insert C-6, 10 μFD (MFD) tubular capacitor as shown in Figure #1. Be sure to observe the polarity (+ and —) of this capacitor. (S)

19 (✓) Insert rectifier CR-1 as shown in Figure #1. Be sure that the positive end of CR-1 which is marked with a plus sign (+) is inserted into the hole on the laminated circuit board which is also marked with a plus (+) sign. (S)

20 (✓) Insert the three section potentiometer which consists of R-6, R-7, and R-18 into the holes on the laminated circuit board. The slotted adjustment knobs should face as in Figure #1. (S)

21 (✓) Insert the nine pin 12AU7 tube socket into the laminated circuit board, snapping the lugs into the holes. (S)

22 (✓) Insert the seven pin 6AL5 tube socket. (S)

23 (✓) Mount transformer (T-1) as shown in Figure #1 with two round head #8-32 by ⅜" long screws, two #8 internal tooth lockwashers, two flat washers ¾" OD, ⅜" ID, and two #8-32 hex nuts. Place the heads of the screws on the copper foil side, the flat washers between the board and the transformer, and the lockwashers between the nut and the transformer.

24 (✓) Insert one green lead from transformer T-1 into either hole on the laminated circuit board marked "T-1 GREEN". (S)

25 (✓) Insert the remaining green lead of transformer T-1 into the other hole marked "T-1 GREEN". (S)

26 (✓) Insert one red lead from transformer T-1 into either hole marked "T-1 RED". (S)

27 (✓) Insert the remaining red lead of transformer T-1 into the other hole marked "T-1 RED". (S)

28 (✓) Clip off the excess lead wire (red wires and green wires) so that they protrude through the laminated circuit board to about ⅛" above the copper foil.

29 (✓) Mount the battery clip with one #4-40 by ¼" long screw, one #4-40 hex nut, and one #4 split lockwasher. Place first the lockwasher and then the nut on the copper foil side.

30 (✓) Solder a 1" length of wire to the positive (+) battery terminal hole on the laminated circuit board.

31 (✓) Solder a 1" length of wire to the negative (—) battery terminal hole on the laminated circuit board.

32 (✓) Insert the two ends of the pigtail fuse F-1 into the holes in the laminated circuit board marked "F-1" so that the body of the fuse remains 1" from the surface of the laminated circuit board. (S) Clip excess wire about ⅛" above the copper foil.

NOTE: The hookup wire connections on the laminated circuit board are numbered 1 through 13 for the purpose of locating these connections.

33 (✓) Insert one end of a 5" length of wire into hole #1 on the laminated circuit board. (S)

34 (✓) Insert one end of a 5" length of wire into hole #2 on the laminated circuit board. (S)

35 (✓) Insert one end of a 4" length of wire into hole #3 on the laminated circuit board. (S)

36 (✓) Insert one end of a 4" length of wire into hole #4 on the laminated circuit board. (S)

37 (✓) Insert one end of a 4" length of wire into hole #5 on the laminated circuit board. (S)

38 (✓) Insert one end of a 5" length of wire into hole #6 on the laminated circuit board. (S)

39 (✓) Insert one end of a 4" length of wire into hole #7 on the laminated circuit board. (S)

40 (✓) Insert one end of a 4" length of wire into hole #8 on the laminated circuit board. (S)

41 (✓) Insert one end of a 4" length of wire into hole #9 on the laminated circuit board. (S)

42 (✓) Insert one end of a 3" length of wire into hole #10 on the laminated circuit board. (S)

43 (✓) Insert one end of a 3" length of wire into hole #11 on the laminated circuit board. (S)

44 (✓) Insert one end of a 10" length of wire into hole #12 marked "RED" on the laminated circuit board. (S)

45 (✓) Insert one lead of R-20 (8.2 ohms 5% gray-red-gold-gold) through the edge hole marked R-20 on the laminated circuit board. Leave approximately ½" of lead between the top of laminated circuit board and the body of the resistor. Turn the laminated circuit board over and solder the lead to the copper foil. Clip off the excess lead to about ⅛" above the copper foil. Resistors R-21, R-22, R-23, R-24, R-25, and R-26 are installed in the same manner, in the following order.

46 (✓) Insert R-21 (100 ohms 5% brown—black—brown—gold) (S)

47 (✓) Insert R-22 (1K ohms 5% brown—black—red—gold) (S)

48 (✓) Insert R-23 (10K ohms 5% brown—black—orange—gold) (S)

49 (✓) Insert R-24 (100K ohms 5% brown—black—yellow—gold) (S)

50 (✓) Insert R-25 (1 megohm 5% brown—black—green—gold) (S)

51 (✓) Insert R-26 (10 megohms 5% brown—black—blue—gold) (S)

52 (✓) Place a piece of sleeving 1" long over lead of R-10 and insert R-10 (10K ohms 5% brown—black—orange—gold) into hole #13 on the laminated circuit board so it protrudes through the board only ⅛".

Step C Subassembly of the range switch (S-1) Figure #2

The range switch (S-1) is viewed from the rear. The lugs are numbered in Figure #2 for wiring purposes. These numbers do not appear on the switch. All the resistors on this assembly are precision resistors. (Within ±1% of the nominal value)

NOTE: Care should be exercised in handling the precision resistors to prevent alteration of their value. While soldering, grip the lead between the resistor and the solder joint with a pair of pliers to prevent excessive heat transfer to the resistor element. Excessive heat will cause permanent damage to the resistor element. Crimp all the leads to the lugs on this assembly as shown in Figure #2.

1 (✓) Connect a 3" length of wire to lug #8 of S1B. (S)

2 (✓) Connect R-1 (900K ohms 1%) between lug #9 and lug #10 of S1B. (NS)

3 (✓) Connect R-2 (320K ohms 1%) between lug #10 and lug #11 of S1B. (NS)

4 (✓) Solder lug #10 of S1B.

5 (✓) Connect a 5" length of wire to lug #1 of S1A rear and front as shown in Figure #2. (S)

6 (✓) Connect a 5" length of wire to lug #3 of S1A. (S)

7 (✓) Connect a 5" length of wire to lug #4 of S1A. (NS)

8 (✓) Connect R-27 (7 megohms 1%) between lug #4 and lug #5 of S1A. (NS)

9 (✓) Connect R-28 (2 megohms 1%) between lug #5 and lug #6 of S1A. (NS)

10 (✓) Connect R-29 (700K ohms 1%) between lug #6 and lug #7 of S1A. (NS)

11 (✓) Connect R-30 (200K ohms 1%) between lug #7 of S1A and lug #8 of S1A front and rear. (NS)

12 (✓) Connect R-31 (70K ohms 1%) between lug #8 and lug #9 of S1A. (NS)

13 (✓) Connect R-32 (20K ohms 1%) between lug #9 and lug #10 of S1A. (NS)

14 (✓) Connect one end of R-33 (10K ohms 1%) to lug #10 of S1A. (S)

15 (✓) Solder lugs #4, #5, #6, #7, #8, and #9 of S1A front and rear.

16 (✓) Trim off excess leads from soldered joints

Step D Panel Assembly Figure #1 and Figure #3

1 (✓) Insert ground jack (black), DC jack (red), AC ohms jack (blue), in panel as shown in Figure #3. Lay panel face down on a clean cloth and slide the retaining lockwashers over the shanks of all jacks, with the pointed lugs of the washers toward the panel. Force lockwashers down flush to panel by firmly pressing with the points of an opened pair of pliers.

2 (✓) Remove the cambric backing from the piece of cork-and-rubber tape supplied and place it in the V-formed end of the lamp holder bracket (LHB).

3 (✓) Place one ⅜" I.D. internal tooth lockwasher over the shaft of the R-11 (10K ohms potentiometer marked B-904012-1). Then place the lamp holder bracket (LHB) and another ⅜" I.D. internal tooth lockwasher over the first lockwasher as indicated in Figure #3.

4 (✓) Insert R-11 through the back of the panel as shown in Figure #3. The V-formed end of the lamp holder bracket should cover the hole in the front panel.

5 (✓) Secure R-11 to the front panel with a ⅜" I.D. flat washer and a round knurled nut as shown in Figure #3. Tighten the knurled nut by carefully gripping it with a pair of pliers.

6 (✓) Slip a ⅜" I.D. internal tooth lockwasher over the shaft end of R-8 (15K ohms potentiometer) marked B-904012-2). Secure to the panel with a ⅜" I.D. round knurled nut and flat washer as shown in Figure #3. Tighten the knurled nut by carefully gripping it with a pair of pliers.

7 (✓) Remove the shorting wire from the meter terminals and mount the meter to the panel. Secure it with two #6 internal tooth lockwashers, and two #6-32 hex nuts using the short meter screws. Gently tighten nuts. At this point it would be well to Scotch-tape a piece of clean paper over the meter face to protect it from becoming scratched.

8 (✓) Mount the laminated circuit board to the panel by placing the two 1¾" spacers over the long meter screws. Place the long meter screws through the holes in the board (Figure #3). Secure the laminated circuit board with two #6 internal tooth lockwashers and two #6-32 hex nuts. Place two ½" flat washers and two ¼-24 nuts on meter studs and tighten gently.

9 (✓) Connect wire coming from #12 on the laminated circuit board to lug #2 on R-11 (10K ohms potentiometer). Figure #1 (S)

10 (✓) Connect wire coming from #8 on the laminated circuit board to lug #3 on R-11 (10K ohms potentiometer). Figure #1 (S)

11 (✓) Connect Resistor (R-10) coming from #13 on the laminated circuit board (Figure #1) to lug #1 on R-11 (10K ohms potentiometer), covering the lead with 1" of insulating sleeving. (S)

12 (✓) Connect wire coming from #10 on the laminated circuit board (Figure #1) to lugs #1 and #2 on potentiometer R-8 (15K ohms). (Strip wire so it will reach across both lugs). (S)

13 (✓) Connect a 4" length of wire to lug #3 of potentiometer R-8 (15K ohms). (S)

14 (✓) Cover each lead of the neon lamp with a 4" length of insulating sleeving.

15 (✓) Insert the neon lamp under the lamp holder bracket as shown in Figure #1.

16 (✓) Insert one lead of the neon lamp through the hole on the laminated circuit board directly between the "R" and "20" of the marking "R-20". Pull on the lead until the insulating sleeving touches the laminated circuit board. (S) Clip off excess wire to about ⅛" above the copper foil.

17 (✓) Place a ⅜" I.D. internal tooth lockwasher over the shaft end of S2 (function switch) and position the switch as shown in Figure #1 and #3. Tighten the switch to the panel with a ⅜" I.D. hex nut.

NOTE: At this point, place the blue plastic knob on the switch to make sure that the white line on the knob lines up with the position lines on the panel. If they do not line up, loosen the large hex nut and reposition the switch until all five positions align.

18 (✓) Connect wire coming from #11 on laminated board (Figure #1) to lug #1 of S2A. (S)

19 (✓) Connect the remaining neon lamp lead to lug #2 of S2A. (Figure #1) (NS)

20 (✓) Unwind the line cord and pass the grommet over the cord.

21 (✓) Split the two conductors in the line cord approximately 6" from the stripped ends.

22 (✓) Connect one lead of the line cord to lug #3 of S2A. (S)

23 (✓) Tie the remaining lead of the line cord around the spacer as shown in Figure #1, Detail "A".

24 (✓) Insert the tied lead of the line cord into the hole in the laminated circuit board marked "LINE CORD" on the board. (S)

25 (✓) Connect wire coming from #9 on laminated board (Figure #1) to lug #10 of S2A. (S)

26 (✓) Connect wire coming from #5 on laminated board (Figure #1) to lug #12 of S2A. (S)

27 (✓) Connect a 4" length of wire from lug #10 of S2B to solder lug on "AC-ohms" input jack. (Figure #1) (Solder both connections)

28 (✓) Connect wire coming from #4 on laminated board (Figure #1) to lug #8 of S2A. (S)

29 (✓) Connect the 4" wire from R-8 (15K ohms potentiometer) lug #3 to lug #6 of S2A. Figure #1 (S)

30 (✓) Connect wire coming from #7 on laminated board (Figure #1) to lug #4 of S2A. (S)

31 (✓) Connect a 3" length of wire from lug #6 of S2B to solder lug on "DC" jack on panel (Figure #1). Solder the wire at lug #6 of S2B only.

32 (✓) Connect wire coming from #3 on laminated board (Figure #1) to lug #4 of S2B. (S)

33 (✓) Connect the wire coming from #2 on the laminated circuit board (Figure #1) to lug #2 of S2B. (S)

34 (✓) Place a ⅜"I.D. internal tooth lockwasher over the shaft end of S1 (range switch), positioning the switch as shown in Figure #3 and Figure #1. Tighten the switch to the panel with a ⅜" I.D. hex nut. Install the blue plastic knob on the shaft and realign the switch if necessary to make the white line on the knob line up with the seven positioning lines on the panel.

35 (✓) Connect R-3 (138K ohms 1%) between lug #11 of S1B and the solder lug on the "Ground" jack. Solder lug #11 of S1B.

36 (✓) Connect the loose end of R-33 (10K ohms 1%) from lug #10 of S1A to the solder-lug on the "Ground" jack (Figure #1). (NS)

37 (✓) Connect the wire coming from #6 on the laminated circuit board (Figure #1) to the solder-lug on the "Ground" jack on panel. (NS)

38 (✓) Connect C-8 (470 μμFD disc capacitor) between the solder-lug on the "DC" jack and the solder-lug on the "GROUND" jack as shown in Figure #1. (S) Dress the disc capacitor body as shown in Figure #1.

39 (✓) Connect the wire coming from lug #8 of S1B to lug #11 of S2B. (Figure #1) (S)

40 (✓) Connect the wire coming from lug #1 of S1A to lug #1 of S2B. (Figure #1) (S)

41 (✓) Connect the wire coming from lug #3 of S1A to lug #3 of S2B. (Figure #1) (S)

42 (✓) Connect the wire coming from lug #4 of S1A to lug #5 of S2B. (Figure #1) (S)

43 (✓) Connect the wire coming from #1 on the laminated circuit board (Figure #1) to lug #12 of S1B. (S)

44 (✓) Connect R-20 (8.2 ohms 5% gray—red—gold—gold) to lug #1 of S1B. (Figure #1) (S)

45 (✓) Connect R-21 (100 ohms 5% brown—black—brown—gold) to lug #2 of S1B. (Figure #1) (S)

46 (✓) Connect R-22 (1K ohms 5% brown—black—red—gold) to lug #3 of S1B. (Figure #1) (S)

47 (✓) Connect R-23 (10K ohms 5% brown—black—orange—gold) to lug #4 of S1B. (Figure #1) (S)

48 (✓) Connect R-24 (100K ohms 5% brown—black—yellow—gold) to lug #5 of S1B. (Figure #1) (S)

49 (✓) Connect R-25 (1 megohm 5% brown—black—green—gold) to lug #6 of S1B. (Figure #1) (S)

50 (✓) Slip a 1-inch length of insulating sleeving over the loose lead of R-26 (10 megohms 5% brown—black—blue—gold) and connect it to lug #7 of S1B. (Figure #1). (S)

51 (✓) Cut leads of C-1 to 1" and connect C-1 (.047 μFD tubular shaped capacitor) between lug #8 of S2B and lug #9 of S1B. (Figure #1). (S)

52 (✓) Connect the long black lead from transformer (T-1) to lug #2 of S2A. (S)

53 (✓) Connect the remaining lead of transformer (T-1) to the hole on the laminated circuit board marked "T-1 BLACK". (S)

54 (✓) Insert the two tubes in their sockets.

55 (✓) Insert the two black rubber knobs on the potentiometer shafts.

56 (✓) Adjust and position all leads and resistors so as to prevent shorting of any leads to each other or grounding to any metal part. ***This is extremely important. Look very closely at the resistors on range switch.***

57 (✓) Clean the negative terminal (flat side) of the battery VS035 with a knife or sandpaper to make soldering easy.

58 (✓) Tin the negative (flat side) terminal and the positive (+) terminal (center post) of the battery VS035.

59 (✓) Insert the battery into the battery clip on the laminated circuit board as shown in Figure #1 noting the position of the positive (+) terminal of the battery.

60 (✓) Solder the leads directly beneath each of the battery terminals to the tinned areas on terminals.

Step E Test Lead Assembly (Figure #4)

1 (✓) Strip the insulation from both ends of the three lengths of test lead wire (about ¼" from the end), and tin one end of each wire.

2 (✓) Insert the tinned end of the black test lead wire into the alligator clip. (S)

3 (✓) Disassemble the black banana plug, and slip the black plastic housing over the black test lead wire with the threaded portion near the untinned end of the wire.

4 (✓) Insert the untinned end of the black test lead into the metal part of the banana plug so that the wire passes through the small hole. Wrap clockwise around plug as viewed from the threaded end, then screw the black plastic housing over plug. (See Figure #4, Detail "A")

5 (✓) Disassemble the blue banana plug and slip the blue plastic housing over the untinned end of the blue test lead with the threaded portion of the plastic housing near the untinned end.

6 (✓) Insert the untinned end of the blue test lead into the metal plug and screw on the blue plastic housing as described above.

7 (✓) Disassemble the blue test probe and slip the blue plastic housing over the tinned end of the blue test lead with the threaded portion near the tinned end.

8 (✓) Insert the tinned end of the blue test lead wire into the probe tip and solder in place. Do not get any solder on the threads. Screw the plastic housing on the probe tip.

9 (✓) Disassemble the red banana plug and slip the red plastic housing over the untinned end of the red test lead with the threaded portion of the plastic housing near the untinned end.

10 (✓) Insert the untinned end of the red test lead into the metal part of the banana plug and screw the red plastic housing on as described above.

11 (✓) Disassemble the red test probe and slip the red plastic housing over the tinned end of the red test lead with the threaded portion near the tinned end.

12 (✓) Cut leads of R-36 to ¾" and solder R-36 (1 Megohm 5% brown-black-green-gold) to the tinned end of the red test lead.

13 (✓) Solder the other end of R-36 (1 Megohm 5%) into the probe tip being careful not to get any solder on the threads. Screw the red plastic housing on the probe tip.

Step F Calibration

1 (✓) Mechanical Zero Adjustment
The pointer should rest at "0" when the selector switch is in the "OFF" position. If the pointer should come to rest at a deflected position, adjust the plastic screw on the front of the meter case so that the pointer lines up with the "0" mark on the meter scale.

2 (✓) Warmup
Place the instrument in its normal operating position. Support it in the rear at the power transformer. Insert the AC plug into a 117 volt 50 or 60 cycle AC outlet. Set the selector switch to the "+DC VOLTS" position and the range switch to the "1.5V" position. After 15 to 30 seconds warmup time, adjust the "ZERO ADJ" control so that the meter pointer rests on "0". Carefully examine the electrical components for any sign of overheating, which may have resulted from errors in construction. If there is no indication of smoking or overheating and the meter can be set to zero, let it thoroughly warm up for about 15 to 20 minutes before calibrating.

3 (✓) DC Calibration
Plug in the red and black test leads, and connect the "DC" probe (red) to the "GROUND" lead (black). With the "ZERO ADJ" control, set the meter pointer to "0". The selector switch is still in the "+DC VOLTS" position and the range switch is still in the "1.5V" position. Disconnect the "DC" probe from the "GROUND" lead and touch the "DC" probe to the positive terminal (the small terminal of the battery on the board). Adjust the DC calibration potentiometer R-7 (middle section of the three section potentiometer mounted to the laminated circuit board) until the meter pointer is in the position as shown by Figure #5.

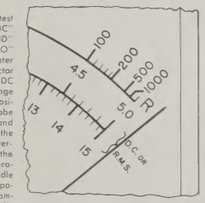


FIGURE 5.

4 (✓) AC Balance Adjustment
Set the selector switch to "—DC VOLTS" and the range switch to "1.5V". Connect the "DC" probe (red) and the "AC" probe (blue) to the "GROUND" lead (black). Adjust the "ZERO ADJ" control so that the meter pointer is exactly at "0". Set the selector switch to "AC VOLTS" and adjust the AC balance potentiometer R-18 (top section of the three section potentiometer) so that the meter pointer is exactly at "0". The meter pointer should not move when the selector switch is changed from "AC VOLTS" to "—DC VOLTS". Disconnect the three test leads from each other.

5 (✓) AC Calibration
Set the function switch to the "AC VOLTS" position and the range switch to the "150V" position.

WARNING: The 117V AC line is dangerous. Proceed with caution.

6 (✓) **Connect the "AC" probe (blue) and the "GROUND" lead (black) to the 117V AC line. Adjust the AC calibration potentiometer R-6 (lower section of the three section potentiometer) so that the meter pointer indicates exactly 117 Volts on the R.M.S. scale. Remove the leads from the AC line.**

7 (✓) Ohmmeter Operation Check
Check the ohmmeter operation by setting the selector switch to "R OHMS" position and the range switch to "RX1 MEG" position. Connect the "AC OHMS" probe (blue) to the "GROUND" lead (black) and set the "ZERO ADJ" control so the meter pointer indicates "0". Disconnect the test leads. The pointer should move to the right side of the meter. Adjust the "OHMS ADJ" control so that the pointer indicates full scale deflection (small line to the right of the 1000 mark on the R scale). Repeat both the shorted and open conditions of the test leads for each position of the range switch.

8 ( ) Tube Aging
Before final calibration, make sure that the tubes are properly aged. While the use of a tube which is not aged will not materially affect the accuracy of the instrument, it may be necessary to rezero the instrument, when switching between DC ranges, or from "+DC VOLTS" to "—DC VOLTS". A usually satisfactory procedure is to operate the tubes in the instrument for a period of 36 to 48 hours, before final calibration.

9 ( ) Final Calibration
After the tubes have been aged, repeat the calibration procedure.

NOTE: If other accurately known DC and AC voltages are available, these may be substituted in the calibration procedure.

Step G Final Assembly (Figure #6)

1 (✓) Assemble the handle to the case as shown using two short spacers, two oval head screws #8-32 x ⅜" lg. 2-#8 internal tooth lockwashers, and two #8-32 hex nuts. Figure #6, Detail "A".

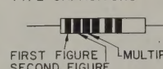
2 (✓) Mount the four rubber feet to the bottom of the case by pressing and turning into the holes provided.

3 (✓) Pass the line cord through the hole in the back of the case and insert the rubber grommet on the line cord into the hole.

4 (✓) Align the unit in the case and fasten the panel to the case with #4 sheet metal screws.

WORK AREA

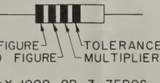
STANDARD COLOR CODE FOR MOLDED TUBULAR PAPER TYPE CAPACITORS



EXAMPLE: RED-VIOLET-YELLOW = 270,000 MICRO-MICRO FARADS, WHICH IS USUALLY WRITTEN .27 MICRO-FARADS.

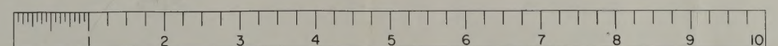
COLOR	FIGURE	MULTIPLIER	TOLERANCE
BLACK	0	NONE	
BROWN	1	0	
RED	2	00	
ORANGE	3	000	
YELLOW	4	0,000	
GREEN	5	00,000	
BLUE	6	000,000	
VIOLET	7	0,000,000	
GRAY	8	00,000,000	
WHITE	9	000,000,000	
GOLD		0.1	±5%
SILVER		0.01	±10%
NO COLOR			±20%

STANDARD RESISTOR COLOR CODE



K=X 1000 OR 3 ZEROS
MEG.=X 1,000,000 OR 6 ZEROS

EXAMPLE: RED-VIOLET-YELLOW-SILVER = 270,000 OHMS ±10%, WHICH IS USUALLY WRITTEN 270K ±10%.



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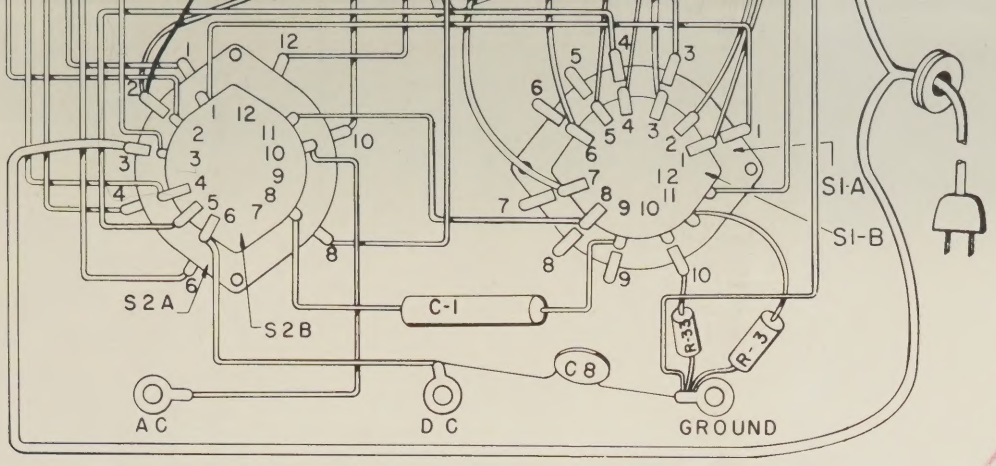
Printed in U.S.A.



BEFORE PROCEEDING, READ INTRODUCTORY INSTRUCTION PAMPHLET

Step A Preparing hookup wire

1 (✓) Cut one 10 inch wire lead from the supplied hookup wire

2 (✓) Cut six 5 inch wire leads from the supplied hookup wire

3 (✓) Cut eight 4 inch wire leads from the supplied hookup wire

4 (✓) Cut four 3 inch wire leads from the supplied hookup wire

5 (✓) Cut two 1 inch wire leads from the supplied hookup wire

6 (✓) Strip the insulation approximately 3/16" from each end

Step B Subassembly of the Laminated Circuit Board (Fig. #1)

Orientate the laminated circuit board (with copper side down) as shown in Figure #1.

(S) means solder

SHAFT—

29 (✓) Mount the battery clip with one nut, and one #4 split lockwash nut on the copper foil side.

30 (✓) Solder a 1" length of wire to the laminated circuit board.

31 (✓) Solder a 1" length of wire to the laminated circuit board.

32 (✓) Insert the two ends of the pigtail cuit board marked "F-1" so that surface of the laminated circuit bo the copper foil.

NOTE: The hookup wire connections on t through 13 for the purpose of loc

33 (✓) Insert one end of a 5" length of board. (S)

34 (✓) Insert one end of a 5" length of board. (S)

35 (✓) Insert one end of a 4" length of board. (S)

36 (✓) Insert one end of a 4" length of board. (S)

37 (✓) Insert one end of a 4" length of board. (S)

38 (✓) Insert one end of a 5" length of board. (S)

39 (✓) Insert one end of a 4" length of board. (S)

PO 12118

ASCO laboratory

1979 SOUTH RITCHEY • SANTA ANA, CALIFORNIA 92705 • (714) 541-6629

7620
(Test Number)

STANDARDS LAB CALIBRATION REPORT

This report is to certify that this instrument has been calibrated within the tolerance stated by the manufacturer unless otherwise stated. Standards used are traceable to the National Bureau of Standards and certifications are on file, in accordance with MIL-C-45662A.

VOLTS: _____ CAPACITANCE: _____ RESISTANCE: _____

EQUIPMENT PARTICULARS

Customer: PARKO ELECTRONICS
Equipment: GEN RAD COUNTER
Model Number: 1192
Serial Number: 00745
I.D. Number: TE 1113-1
Test Date: 8-25-80
Due Date: 2-25-81

RECEIVED CONDITION

- ☐ Non Operational
- ☐ Within Tolerance
- ☐ Out of Tolerance
- ☒ Operational Defect
- ☐ Physical Damage

REMARKS: "OPERATES FOR A FEW MINUTES THEN ALL DIGITS COME ON."

WORK PERFORMED

- ☐ Performance Check
- ☒ Calibrated to Mfg. Spec.
- ☐ Calibrated to _____%
- ☐ Certified-Mechanical Only
- ☒ Repair – See Remarks

REMARKS: REPLACED Q9 AS NEEDED.

NOTE: DATA AVAILABLE

TEST CONDITIONS & STANDARDS

Temperature: 74°F
Humidity: 54%
Technician: 18
Approved by: JB

Standards Used	Model No.	ID No.	Recalibrate Due Date
TIME MARK GEN	184	79-4	1-31-81

IEC DRM DRAWING FORM	

TYPE OF RELEASE	✓	DATE
DEV(X)—NOT REL'D		
RELEASED	✓	

APPLICATION

JOB FIRST USED ON	870

FOR ALL WHERE-USE SEE UDAR

NEXT [illegible]	REQD	USED ON

REVISIONS

FOR DRAWING REVISION STATUS SEE UNITIZED DOCUMENT AUDIT REPORT (UDAR)

LTR	DESCRIPTION	DATE	APPROVAL
—	RELEASED PER E.O. 82666	5-27-77	[illegible] RAB
A	[illegible]	2-24-77	[illegible]

PRELIMINARY

NOT RELEASED

3/14/75

REDACTRON

TOLERANCES UNLESS OTHERWISE SPECIFIED	APPROVAL	NAME	DATE
DIMENSIONS IN INCHES	DRAWN	P. Fuelson	5-27
TOLERANCES .XX ± .03, .XXX ± .010, ANGULAR ± 0°30', HOLE DIA UP TO .250 +.005 −.003	CHECKED	[illegible] OESTREICH	5-27-77
DO NOT SCALE DRAWING	PROJ / DESIGNER	J.V. LANGOR	5/27/77
MATERIAL	MFG.		
FINISH	P A.	B. WRIGHT	5/27/77
CONTRACT NO.	PURCH.	G. BANHAM	5/27/77
FOR ALL OTHERS SEE UDAR	APPROVED	J. JARDINE	5/27/77

APPROVED FOR STRATEGIC SYSTEMS PROJECT OFFICE (SSPO)

BY DIRECTION

INTERSTATE ELECTRONICS CORPORATION
SUBSIDIARY OF AEG
707 E. Vermont Ave., P.O. Box 3117, Anaheim, CA 92803 714-772-2811

TITLE

CONTROL, PANEL ASSEMBLY:

SIZE	CODE IDENT NO.		REV.
A	07421	684-006	4
SCALE	REV IN—FILE DATE	SHEET 1	OF 27

R-2938

TABLE OF CONTENTS

ILLUSTRATIONS

TABLES

1.0 SCOPE

This specification defines the requirements for the SEA WATCH Analyst Console Control Panel Assembly.

2.0 APPLICABLE DOCUMENTS

2.1 GOVERNMENT REFERENCE DOCUMENTS

MIL-STD-1280	28 January 1969
MIL-STD-188C	Notice 1, 1 June 1976

Note that it is not required that the control panel assembly meet these military standard specifications. These MIL-STD documents may be used as a common point of reference for functional operations.

2.2 GOVERNMENT COMPLIANCE DOCUMENTS

MIL-STD-454	Requirement 1 (Safety)
MIL-STD-454	Requirement 5 (Soldering)
MIL-STD-454	Requirement 9 (Workmanship)

3.0 REQUIREMENTS

3.1 MECHANICAL

The control panel assembly to be furnished by the supplier is shown in Figures A .

The keyboard panel, trackball panel, and ashtray/cupholder panel are supported by a turret structure as shown in Figure A. Interstate will provide the empty turret structure to the control panel assembly supplier. The active monitor indicator lamps (no panel) to be supplied by vendor.

All associated encoding electronics provided with the control panel are to be contained within the turret, integral with the removable panels. Three 40 pin connectors (3M 3324-0000 or equivalent) of signal input/output shall be provided. (mate 3495-2003) These forty pin connectors must be mounted on the printed circuit board. (Indicator PC board)

All panels shall be independently removable for servicing through the use of appropriate mechanical fasteners, connectors and service loops where required. Also, the trackball panel and ashtray/cupholder panel shall be interchangeable, allowing for left handed operation of the trackball.

All dual in-line packaged integrated circuits must be mounted in sockets.

Interstate will furnish to the control panel assembly supplier (1) detailed outline and mounting drawings of the empty turret structure within 4 weeks of award of contract. The trackball will be supplied and installed by IEC.

The supplier shall prepare, and retain for future reference, all detail and assembly drawings, parts lists and other documentation (except the turret structure drawing) necessary to document the design and fabrication of the control panel assembly, using the supplier's own document forms and commercial standards. Military specification documentation is not required.

3.2 ELECTRICAL REQUIREMENTS

The following is a discussion of the electrical characteristics required of the systems control keyboards:

Electrically, the keyboard output shall be divided into four groups: (1) the conversational and special keyboard, (2) the fixed function keyboard, (3) the changeable function keyboard, and (4) the zoom control keyboard. Unless otherwise stated all inputs and outputs to the keyboard shall be assumed to be fully TTL compatible, a HIGH or 1 meaning +2.4 volts (minimum), supplying 2.6 milliamps and a LOW or Ø meaning +.5 volts (maximum) sinking 24 milliamps. Note that a Fairchild 74LS367 or equivalent will meet there interface requirements.

The conversational and special keyboard code shall be modified USCII while the fixed function, the changeable function, and zoom control keyboards, as well as the keyboard lighting, shall be straight binary or binary coded decimal (BCD). Debouncing of all switch closures is required to prevent multiple codes.

3.2.1 Conversational and Special Keyboards (Modified ASCII)

Figure B is the proposed modified ASCII keyboard. One bit shall be defined to provide a special symbol shift for the special symbols shown in superscripts on the keys of the Conversational Keyboard. This bit shall be controlled by the "SYM" (Symbol Shift) key. With the depression of the normal "SHIFT" or "SHIFT LOCK" keys the normal shift to the seven bit ASCII code of the superscript shall occur, with the exception of the 26 capital letters of the alphabet. The upper case alphabet character codes must be presented in both the shifted and unshifted modes.

In the normal shift mode the symbol shift bit will remain at its normal LOW (Ø) level. With the depression of the "SYM" shift key, all of the normal ASCII shift codes are generated and ths symbol shift bit goes from a LOW (Ø) to a HIGH (1). Thus, any seven bit ASCII character code preceded by a one in the symbol shift bit will characterize a symbol. If the "SHIFT" or "SHIFT LOCK" keys are depressed concurrently with the "SYM" shift key, a 1 shall still be placed in the symbol shift bit and the code will be that of a symbol. The symbol shift bit simply adds an extra dimension to the seven-bit ASCII character code.

The proposed character codes and their representations are shown in table 1. Note that two codes are required for both the "EDIT" and "REPEAT" keys, one momentary code for the depression and one momentary code for the release. Also note that there will be two encoded rocker switches: the ATTEND/UNATTEND switch and the REMOTE SELECT A/B Switch.

The Conversational and Special Keyboard (modified ASCII) shall be capable of 2-key rollover. The key caps must be a dark shade, with considerable preference given to dark brown, to minimize a soiled appearance after long periods of continuous use. Normal ASCII characters shall appear in white, and the special symbols as well as the "SYM" mnemonic on the symbol shift keys caps shall appear in gold in their respective positions on the key caps.

The output data lines for the Conversational and Special keyboard shall be taken off connector A as shown in table 2. After each key depression (and release for the EDIT and REPEAT keys) that key's code must be held at the keyboard output and a data Output Ready Signal must be generated. The Conversational Output Ready Signal shall be a single pulse of width 150 ± 50ns whose positive going edge must occur 100 ns (min) after the output data becomes available. The data must be held for a minimum of 200 ns following the positive going edge of the Conversational Output Ready Signal. This data can be held until the next data transfer is required. See figure C for data output timing.

3.2.2 Straight Binary and Binary Code Decimal (BCD) Keyboards
The two function keyboards and the zoom keyboard are the straight binary and BCD keyboards. Two-key rollover for these keys is required. That is, with the depression of a first key the depression of a second key will not be recognized until the release of the first key.

3.2.2.1 The Fixed Function Keyboard - The Fixed Function Keyboard will be located in the upper center portion of the system console as shown in figure A. From right to left the keys shall be encoded zero through fifteen (decimal) (ØØØØ-1111 binary). The output lines from the Fixed Function (FF) keyboard shall be placed on connector A as shown in table 2. The Fixed Function keys shall be momentary action switch/indicators with fixed black legends and externally controlled background indicators. The legends for the Fixed Function keys are given in table 3.

With each key depression the keyboard interface must supply bits FFØ-FF3 (the key code), and a Fixed Function Output Ready Signal (FFORS), The FF Output Ready Signal shall have the same electrical characteristics as the Conversational Output Ready Signal. See figure D for data output timing.

The background indicators on the Fixed Function keys shall be turned on and off externally. Each key shall have its own address. Table 4 lists a possible addressing scheme for the fixed function keys. With each key address a "Key ON/OFF" bit shall be set or cleared (1 or Ø) and the background indicator must be turned ON (amber) or OFF (green) respectively.

With the initial power on sequency background indicators must come up in the green (OFF) state. After a key is depressed and the code is output, the external device shall address that key and its background will be changed from green (OFF) to amber (ON). Sometime later, that key will again be addressed and its background will be changed from amber to green thereby completing a cycle.

The desired intensity of the output of each lighted key is such that the information displayed is clearly visible at a distance of five to six feet without being a distraction to the operator working under ambient lighting conditions of approximately forty foot lamberts.

To encode the Fixed Function keyboard a National MM74C922 keyboard encoder or equivalent is recommended. With the National encoder, a 4.7 microfarrad debounce capacitor and a .22 microfarrad oscillator capacitor are required.

3.2.2.2 Changeable Function Keyboard - The Changeable Function Keyboard and its thumbwheel shall be located in the upper center portion of the system control panel as shown in figure A. Each Changeable Function Key shall be a momentary action switch/indicator capable of displaying ten different white legends on two background colors. From right to left the key outputs shall be encoded zero through fifteen (decimal) (ØØØØ-1111 binary). The thumbwheel output shall be a binary coded decimal (BCD) type output that must be held on edge connector A at all times.

With the depression of a key, that key's code, the thumbwheel setting, and a Changeable Function Output Ready Signal (CFORS) must be supplied on connector A. The electrical characteristics of the Changeable Function Output Ready Signal shall be the same as the Conversational Output Ready Signal. See figure C for data output timing. The encoding of Changeable Function key must have approximately the same scan time and debounce characteristics as the Fixed Function keys.

The background indicators for the changeable function keys shall be turned OFF and ON externally exactly as the background indicators for the fixed function keys. Table 4 lists the required indicator addresses for the Changeable Function keys. Again, the background code shall be green for OFF and amber for ON. The color and intensity of the backgrounds for these keys must come as close as possible to matching the background for the Fixed Function Keys.

The thumbwheel setting for the Changeable Function Keyboard must dictate the legends of the Changeable Function Keys as well as provide the outputs discussed above. There shall be ten different legends for each key corresponding to thumbwheel setting are listed in table 5. These legends shall appear in white on the aforementioned backgrounds.

3.2.2.3 Zoom Control - The Zoom Control keyboard shall be located in the upper right-hand (or left-hand for a left-handed console) corner as shown in figure D. The Zoom Control keyboard shall consist of ten binary coded decimal keys (Ø-9), and a "ZOOM" key. With each key depression the code of the key being depressed and a "Zoom Output Ready" signal must be presented at the output edge connector (see table 2). The "Zoom Output Ready Signal" shall have the same electrical characteristics as the Conversational Output Ready Signal with respect to the Zoom keyboard. The "ZOOM" key code can be any four-bit code other than the binary coded decimal (Ø-9) to be used for the other ten keys.

3.2.2.4 Trackball - The Trackball shall be located in the upper right-hand corner of the system console next to the zoom control keyboard as shown in figure B. Four lines from the trackball output shall supply TTL pulses whose frequencies are to be directly proportional to the angular velocity of the Trackball. The output shall be encoded as squarewaves at normal TTL voltage levels. The outputs shall appear on edge Connector B as shown in table 6.

There shall be 300 pulses per 360° of Trackball revolution. The Trackball shall be approximately three inches in diameter. It is desired that the Trackball be optically encoded to optimize longevity of operation.

Interstate shall supply the trackball unit with the basic encoding elements as described. The vendor shall provide the necessary cables and interconnection for operation (Amphenol 67-02E-14-12P).

3.2.3 Additional Indicators and/or Switches
Additional switch/indicators not mentioned above are:

a. Row of 16 indicator lamps.

b. The A or B monitor indicator.

c. The POWER ON Switch indicator.

d. BUSY and ALERT indicators.

e. The CURSOR CENTER switch.

f. The ATTENDED/UNATTENDED switch/indicator.

g. The REMOTE ENABLE, the REMOTE SELECT A/B, and the PLOT switches.

h. Audible alarm.

3.2.3.1 Row of 16 Indicator Lamps - There shall be a row of 16 indicator lamps just above the 16 fixed function keys and below the changeable function keys as shown in figure B. These indicators shall be addressed and turned ON or OFF just like the function key indicators; however, there will be only one bulb in these indicators to be turned either OFF or ON. The addressing scheme for these indicators is given in table 3. The indicators shall be amber colored when ON. With the initial power-on sequence, these indicators must come up in the OFF mode (unlit).

3.2.3.2 The A or B Monitor Indicators - The A or B monitor indicators shall be located between the CRT displays. The displays of these indicators shall be large green arrowhead-like projections as shown in figure B.

The monitor indicators shall be addressed as shown in table 3. Just as the row of indicators, these keys shall be addressed and turned ON (green) by placing a 1 in the key ON/OFF bit or OFF by setting this bit to Ø. See the approved parts list for the recommended indicator.

3.2.3.3 The POWER ON Indicator - The POWER ON indicator shall also be located between the monitors between the A or B monitor indicators. The POWER ON indicator shall be a green horizontal bar between the monitor indicators. Together the POWER ON indicator and a monitor indicator shall form an arrow, the POWER ON indicator being the shaft and the monitor indicator being the arrowhead.

The vendor shall light this indicator whenever the control panel assembly receives a regulated +28 VDC from the system power supplies supplied by Interstate.

The module must be supplied in an assembled package with all components necessary to display the indicated projection. See the approved parts list for the recommended indicator.

3.2.3.4 The BUSY and ALERT Indicators - The BUSY and ALERT indicators are located just above the Conversational keyboard as shown in figure C. The BUSY and ALERT mnemonics shall appear in black legends on the indicator caps. These indicators shall be turned ON or OFF exactly like the indicators in the row of 16 indicators and the monitor indicator. Addresses for the BUSY and ALERT indicators are given in table 4. Either the BUSY or ALERT indicator will be addressed and its background will be turned ON (red) or OFF (unlighted).

3.2.3.5 The HOME Switch - The HOME switch (see figure A) shall be a momentary action type switch. With each depression its output shall be a code with the same characteristics as a ZOOM Keyboard output. This code output shall be made available on Connector A as shown in table 2. The code for this key can be any four bit code other than the codes used for the ZOOM Keyboard.

3.2.3.6 The ATTENDED/UNATTENDED Switch/Indicator - The ATTENDED/UNATTENDED switch/indicator shall be rocker switch/indicator. It shall be centered above the Conversational Keyboard as shown in figure B. The coded outputs for the alternate depressions of this key are given in table 1 with the Conversational and Special Keyboard outputs. The output is to be treated as a conversational type output. A Conversational Output Ready Signal must be generated. The indicator shall be lighted amber in the ATTENDED position and lighted green in the UNATTENDED position.

3.2.3.7 The REMOTE ENABLE, the REMOTE SELECT A/B and the COPY Switches - The REMOTE ENABLE, the REMOTE SELECT A/B and the COPY switches will be located in the upper right-hand corner of the "special" keyboard just above the "Conversational" keyboard as shown in figure C. These three switches together shall control the remote video units and inform the console computer of the status of this control.

The REMOTE ENABLE switch will be a three-position rocker switch. When either the C.C.T.V position is selected or the REMOTE SCREEN position is selected, that position's given output control line must be grounded, thereby enabling the video display selected by the REMOTE SELECT A/B switch to be routed to a remote video screen and/or hard copy unit. The REMOTE ENABLE return (ground) must be isolated from the keyboard logic ground. The REMOTE ENABLE output control lines will be on Connector B as shown in table 6.

The REMOTE SELECT A/B switch will be an encoded rocker switch electrically similar to the ATTENDED/UNATTENDED rocker switch but with an additional control function required. One distinct conversational type code must be sent to the console computer to signify the channel selected (one code for Channel A and another for Channel B) and an output line for the control of the selected channel must be grounded. The return for the control side of the switch must be isolated from the keyboard logic ground. The REMOTE SELECT A/B control lines will be output on Connector B as shown in table 6 and its coded output will go out as a Conversational output of Connector A.

The COPY button will be similar to the rest of the momentary action encoded keyboard switches but it too is required to perform an additional control function. When this key is depressed its code will be sent to the computer as a Conversational type output and an output control line will be grounded for the duration of the key depression. Again, like the REMOTE SELECT A/B switch, the COPY control line will be output on Connector B as shown in table 6 and its coded output will go out as a Conversational output on Connector A.

3.2.3.8 Audible Alarm - It is required that the control panel produce an audible alarm. The addresses for this alarm is given in table 3. Each time the alarm is addressed it shall sound for a period of 250 $\pm$ 50 msec. The alarm time-out period shall be retriggerable so that a continuous alarm may be sounded by repeatedly addressing the alarm within periods of 200 ms. The audible device shall be a Mallory SNP428 alarm or equivalent and shall be mounted to one of the removeable boards below the front panel.

3.2.4 Data Input Timing

3.2.4.1 Indicators - As has been discussed earlier all indicators with the exception of the POWER ON and the ATTENDED/UNATTENDED switch/indicators shall be controlled by a device external to the control panel complex. Each of the externally controlled indicators was given an address. These addresses are listed in table 4. Input timing information must now be supplied.

The address codes I_1 - I_6, as given in table 4, shall be supplied by the external device to the keyboard via Connector C as shown in table 7. The shortest interval between new address codes shall be no less that one computer instruction time, or approximately 10 μs. With the exception of this pulse repetition interval minimum, the characteristics for the New Data Ready (NDRDY) signal shall be the same as the Output Ready Signal. With each new address presented a New Data Ready signal shall be supplied by the external device to the keyboard complex via Connector C as shown in table 7.

In order to facilitate design and to insure Interstate's adaptability to the keyboard interface, an addressable latch scheme to decode and hold the fiven inputs is shown in figure E.

3.2.4.2 Master Clear - A Master Clear pulse, "$\overline{\text{MCLR}}$", shall be supplied by the external device to initialize all keyboard logic functions. This Master Clear pulse shall be input on Connector C as shown in table 7. The signal is active low.

3.2.5 Power

3.2.5.1 Overall System - Interstate will supply -12 volts and +5 volts, at approximately 5 percent regulation, to be used for keyboard logic supply. Further, there will be an unregulated +28 volts supplied that is to be used to drive all addressable indicator lamps and the indicator lamps for the legends on the Changeable Function keys. Power will be supplied by Interstate on the female end of a 12 pin MOLEX connector (part no. Ø3-Ø9-1126). Pin assignments are given in Table 8. The vendor must supply the male end of this connector using MOLEX pins.

3.2.5.2 Logic Family - Wherever availability, speed, and drive considerations will permit, it is desired that all logic elements be of the low power Schottky TTL family.

3.3 MATERIALS

Corrosion resisting materials and finishes shall be utilized wherever practical. Metal-to-metal contact of dissimilar metals shall be governed by the criteria of MIL-E-16400. Fungus nutrient materials, mercury, and radio active materials shall not be used in any form.

3.4 NAMEPLATES AND PRODUCT MARKING

There shall be no visible nameplates or product vendor markings.

3.5 PAINT

The control panel, ashtray and cupholder panel, and the Zoom keyboard and Trackball panel edge and front are to be painted light brown, Color Chip 26521, per FED-STD-595, Federal Specification TT-E-5029, Class B, semigloss enamel. Interstate Electronics will supply the paint.

3.6 WORKMANSHIP

Workmanship shall be in accordance with MIL-STD-454 where applicable (see Section 2.2) or with best commercial practices consistent with vendors normal design and production techniques.

4.0 QUALITY ASSURANCE PROVISIONS

Unless otherwise specified in the purchase order the supplier is responsible for assuring conformance to all requirements specified herein. Interstate reserves the right to perform any tests and inspections deemed necessary to assure that these requirements are met.

5.0 PREPARATION FOR DELIVERY

Each unit shipped shall be individually packaged and packed in accordance with standard commercial practices which will assure adequate protection against damage during shipment. The packaging shall conform to applicable carrier rules and regulations.

6.0 NOTES

6.1 APPROVED PARTS LIST

Item	Manufacturer	Mfg. Part Number
Changeable Function Switch/Indicators	Industrial Electronic Engineers (IEE)	2205 Series Rear Projection Switch/Indicator
Fixed Function Switch/Indicators	Microswitch Corporation	AML11GBA2AA
Row of 16 Indicator Lamps and A or B Monitor Indicators	Microswitch Corporation	AML41FBA2
Monitor Indicator	Microswitch Corporation	AML41CBA2
Power Indicator	Microswitch Corporation	AML41FBA2
Remote Select Rocker	Microswitch Corporation	AML14EBA2ACØ1 (2 position)
Remote Enable Rocker	Microswitch Corporation	AML24EBA2ACØ4 (3 position)
ATTEND/UNATTEND Rocker	Microswitch Corporation	AML14GBA2AAØ1
Trackball	Measurement Systems Inc.	Model 628-4 (Interstate to supply)

6.2 SUBSTITUTABILITY

Only those items listed in the Approved Parts List are approved by Interstate for use in the applications specified herein. A substitute item shall not be used without prior approval by Interstate Electronics Corporation.

6.3 AVAILABILITY

Identification of the approved parts herein is not to be construed as a guarantee of continued availability for the items described.

6.4 APPROVED SOURCE OF SUPPLY

Interstate Part No.	Vendor	Vendor Part No.	Description
684-006-001	Parko Electronics	101603	Remote Indicators
684-006-002	Parko Electronics	101604	Keyboard Panel
684-006-003	Parko Electronics	101605	Trackball Panel
684-006-004	Parko Electronics	101606	Ashtray/Cupholder

TABLE I

OCTAL CODE	UNSHIFTED	SHIFTED	SHIFT
00	New Line	New Line	New Line
10	Backspace	Backspace	Backspace
11	Tab	Tab	Tab
12	Line Down	Line Down	Line Down
13	Line Up	Line Up	Line Up
14	Reset	Reset	Reset
15	CR	CR	CR
21	FØ	FØ	FØ
22	F1	F1	F1
23	F2	F2	F2
24	F3	F3	F3
25	F4	F4	F4
26	F5	F5	F5
27	F6	F6	F6
30	F7	F7	F7
31	F8	F8	F8
32	F9	F9	F9
33	Unlabeled	Unlabeled	Unlabeled
34	Send Index	Send Index	Send Index
35	Send	Send	Send
36	Tab Set	Tab Set	Tab Set
40	Space	Space	Space
41		!	
42		"	
43		#	
44		$	
45		%	
46		&	
47		'	
50		(	
51		)	
52		*	
53		+	
54	'		
55	-		
56	.		

TABLE I

OCTAL CODE	UNSHIFTED	SHIFTED	SHIFT
57	/		
60	Ø	Ø	
61	1		
62	2		
63	3		
64	4		
65	5		
66	6		
67	7		
70	8		
71	9		
72	:		
73	;		
74		<	
75		=	
76		>	
77		?	
100	@		
101	A	A	
102	B	B	
103	C	C	
104	D	D	
105	E	E	
106	F	F	
107	G	G	
110	H	H	
111	I	I	
112	J	J	
113	K	K	
114	L	L	
115	M	M	
116	N	N	
117	O	O	
120	P	P	
121	Q	Q	
122	R	R	

TABLE I

OCTAL CODE	UNSHIFTED	SHIFTED	SHIFT
123	S	S	
124	T	T	
125	U	U	
126	V	V	
127	W	W	
130	X	X	
131	Y	Y	
132	Z	Z	
133	[		
134	\		
135	]		
136	^		
140		\	
141	Line Clear	Line Clear	Line Clear
142	Clear Screen	Clear Screen	Clear Screen
143	Clear All	Clear All	Clear All
145	Line Skip	Line Skip	Line Skip
146	Skip	Skip	Skip
150	Copy	Copy	Copy
151	Remote A	Remote A	Remote A
152	Remote B	Remote B	Remote B
153	Edit Down	Edit Down	Edit Down
154	Screen A	Screen A	Screen A
155	Attend	Attend	Attend
156	Repeat Down	Repeat Down	Repeat Down
160	Screen B	Screen B	Screen B
161	Unattend	Unattend	Unattend
162	Edit Up	Edit Up	Edit Up
163	Repeat Up	Repeat Up	Repeat Up
164	Special 1	Special 1	Special 1
165	Special 2	Special 2	Special 2
166	Special 3	Special 3	Special 3
167	Special 4	Special 4	Special 4

TABLE I

OCTAL CODE	UNSHIFTED	SHIFTED	SHIFT
173			
174			
175			
176			
177	Delete	Delete	Delete
241			
242			
243			
244			
245			
246			
247			
250			
251			
253			
260			
274			
275			
276			
277			
301			
302			
303			
304			
305			
306			
307			
310			
311			
312			
313			
314			
315			
316			
317			
320			

TABLE I

OCTAL CODE	UNSHIFTED	SHIFTED	SHIFT
321			
322			
323			
324			
325			
326			
327			
330			
331			
332			

TABLE 2. CONNECTOR A

PIN NO.	SIGNAL		PIN NO.	SIGNAL	
1	ASØ		21	CF2	Changeable Function Key Code
2	AS1		22	CF3	
3	AS2	7-Bit Modified ASCII Code	23	THØ	
4	AS3		24	TH1	Changeable Function Thumbwheel
5	AS4		25	TH2	
6	AS6		26	TH3	
7	AS6		27	GND	
8	SYM	Symbol Shift Bit	28	CFORS	Changeable Function Output Ready Signal
9	GND		29	GND	
10	CORS	Conversational Output Ready Signal	30	ZOOM Ø	
11	GND		31	ZOOM 1	Zoom Key Code
12	FFØ		32	ZOOM 2	
13	FF1	Fixed Function Key Code	33	ZOOM 3	
14	FF2		34	GND	
15	FF3		35	ZORS	Zoom Output Ready Signal
16	GND		36	GND	
17	FFORS	Fixed Function Output Ready Signal	37	SPARE	
18	GND		38	SPARE	
19	CFØ		39	SPARE	
20	CF1		40	SPARE	

TABLE 3
FIXED FUNCTION KEYBOARD
SWITCH/INDICATOR READOUTS

SWITCH NUMBER	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
FIXED	START LOCAL QUERY	DISPLAY LOCAL QUERY	PAGE FORWARD	PAGE BACKWARD	IDENTIFY	PRINT A/N	RESHOW INACTIVE	RESHOW	DISPLAY MERCATOR	DISPLAY NORTH POLAR	DISPLAY SOUTH POLAR	MAGNIFY REDUCE	END	UPPER SCREEN	LOWER SCREEN	SEA WATCH

TABLE 4. INDICATOR ADDRESS CODING

I_3	I_2	I_1	I_0	$I_5 = 0$ $I_4 = 0$	$I_5 = 0$ $I_4 = 1$	$I_5 = 1$ $I_4 = 0$	$I_5 = 1$ $I_4 = 1$
0	0	0	0	A Monitor	Fixed Function Key 0	Changeable Function Key 0	Inidcator Lamp 0
0	0	0	1	Monitor B	1	1	1
0	0	1	0	Busy	2	2	2
0	0	1	1	Alert	3	3	3
0	1	0	0		4	4	4
0	1	0	1		5	5	5
0	1	1	0		6	6	6
0	1	1	1		7	7	7
1	0	0	0		8	8	8
1	0	0	1		9	9	9
1	0	1	0		10	10	10
1	0	1	1	Audible Alarm	11	11	11
1	1	0	0		12	12	12
1	1	0	1		13	13	13
1	1	1	0		14	14	14
1	1	1	1		15	15	15

TABLE 5.
CHANGEABLE FUNCTION KEYBOARD
SWITCH/INDICATOR READOUTS

SWITCH NUMBER	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
	UPDATE AREA CLOSURE	DISPLAY AREA CLOSURE	TRACK SUPPR		MERGE SUBSETS	OVERLAY MAPS	LINE		TIME INTRVL	POINTS ONLY	ALPHA ANNOT				RETRIEVE	KEEP	ROW 1
	POSIT	LOCATE	PORT SHIP NAMES	CONF ELLIPSE	LOB	RANGE CIRCLE	CALC	DR	DISPLAY LAT LONG	DESCRIBE	DISPLAY DTG	DISPLAY SHIP ID	CONNECT	GRAPHIC CURSOR	CHANGE COLORS	STD COLORS	ROW 0
	DATA STATUS	RESOURCE STATUS			LOGIN	LOGOFF	ABORT	PURGE									ROW 9

NOTE: Rows 2 through 8 require no legends at this time.

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TABLE 6. CONNECTOR B

PIN NO.	SIGNAL	PIN NO.	SIGNAL	
1	+X, Pulse-Right Direction	21	SPARE	
2	-X, Pulse-Left Direction	22	SPARE	
3	SPARE	23	SPARE	
4	GND	24	SPARE	
5	SPARE	25	SPARE	
6	+Y, Pulse FWD Direction	26	SPARE	
7	-Y, Pulse AFT Direction	27	SPARE	
8	SPARE	28	SPARE	
9	SPARE	29	SPARE	
10	SPARE	30	SPARE	
11	SPARE	31	SPARE	
12	SPARE	32	Enable Remote Screen	Remote Enable
13	SPARE	33	Remote Enable Return	
14	SPARE	34	Enable C.C.T.V. -	
15	SPARE	35	SPARE	
16	SPARE	36	SELECT A-	
17	SPARE	37	Remote Select Return	
18	SPARE	38	SELECT B	
19	SPARE	39	Copy Control Return	
20	SPARE	40	Copy	

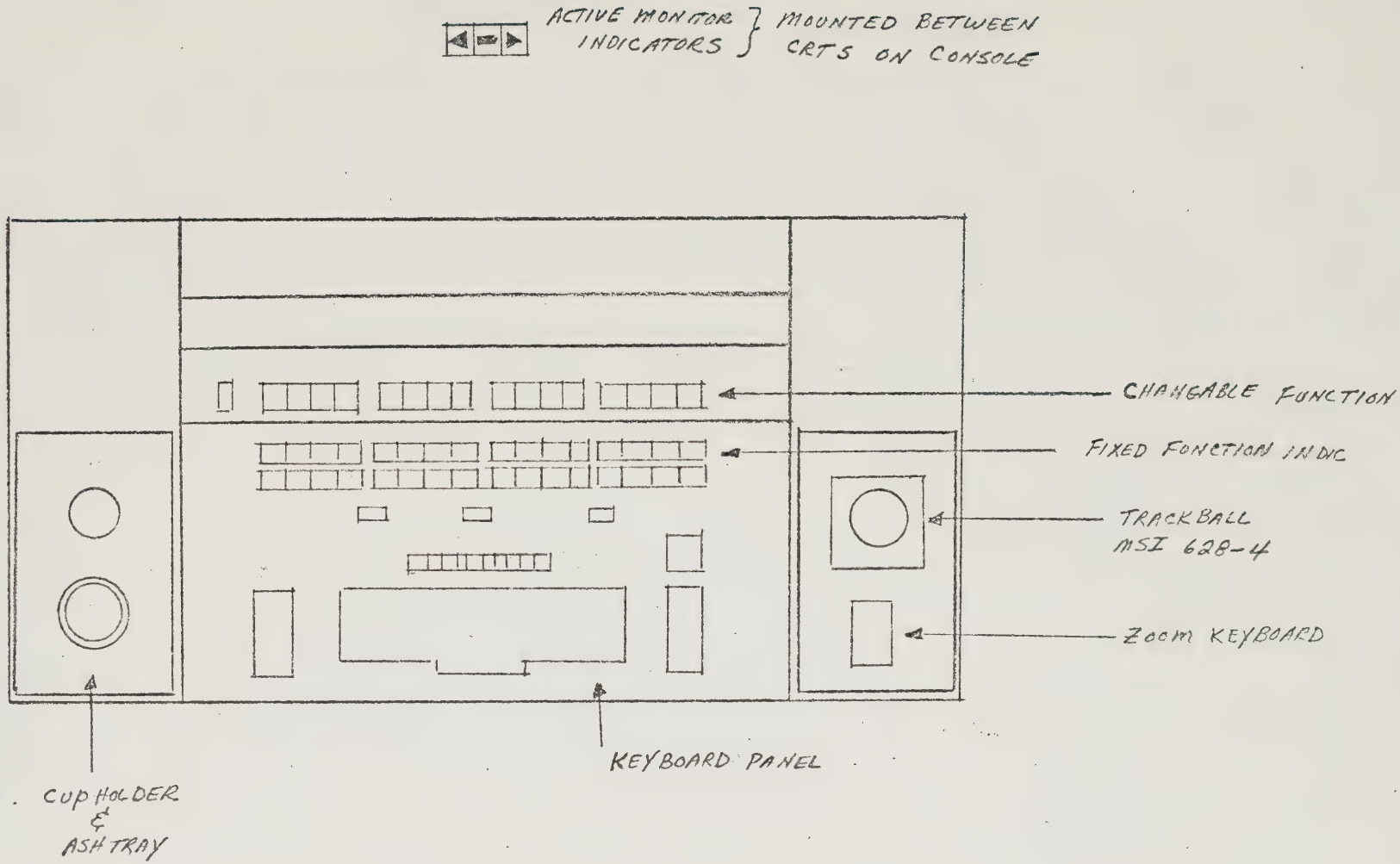
TABLE 7. CONNECTOR C

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	IØ	21	SPARE
2	I1	22	SPARE
3	I2	23	SPARE
4	I3	24	SPARE
5	I4	25	SPARE
6	I5	26	SPARE
7	KEY O/F	27	SPARE
8	GND	28	SPARE
9	NDRDY	29	SPARE
10	GND	30	SPARE
11	SPARE	31	SPARE
12	SPARE	32	SPARE
13	SPARE	33	SPARE
14	SPARE	34	SPARE
15	SPARE	35	SPARE
16	SPARE	36	SPARE
17	SPARE	37	SPARE
18	SPARE	38	GND
19	SPARE	39	MCLR
20	SPARE	40	GND

TABLE 8. POWER CONNECTOR (J1)

PIN NO.	SIGNAL
1	+28 VDC (ORANGE)
2	+28 VDC (ORANGE)
3	+28 VDC (ORANGE)
4	+28 V RET (BROWN)
5	+28 V RET (BROWN)
6	+28 V RET (BROWN)
7	+28 V RET (BROWN)
8	+28 V RET (BROWN)
9	+ 5 VDC (RED)
10	+ 5 VDC (RED)
11	+ 5 V RET (BLACK)
12	-12 V RET (BLACK)
13	-12 VDC (YELLOW)
14	Monitor A Indicator Return (W/BROWN)
15	Monitor B Indicator Return (W/BLACK)

FIG A. CONTROL PANEL



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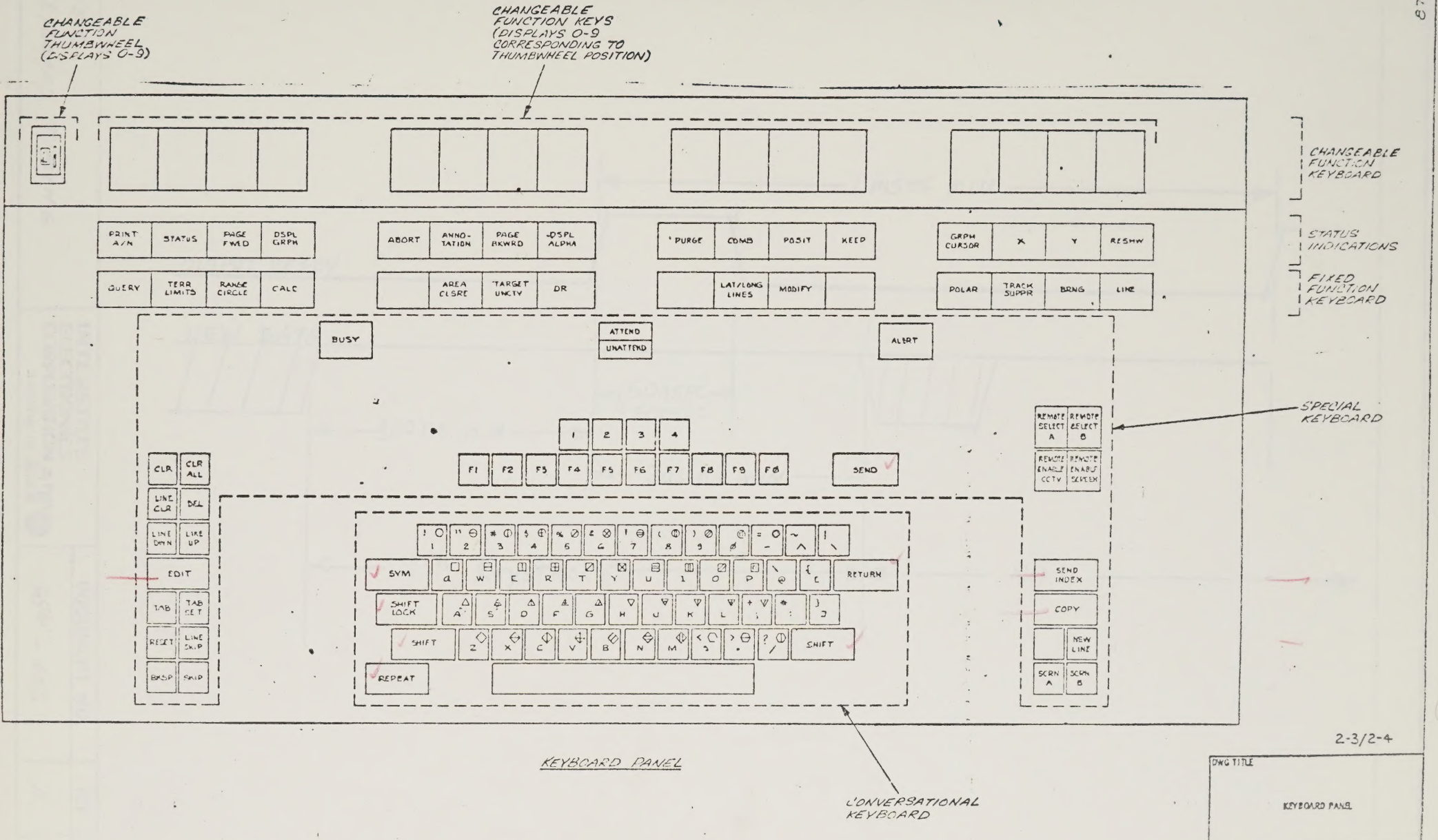

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DWG TITLE			
KEYBOARD PANEL			
SHEET 1 OF 1	FIG. NO. 2-3	PAGE NO.	

FIGURE B
KEYBOARD PANEL

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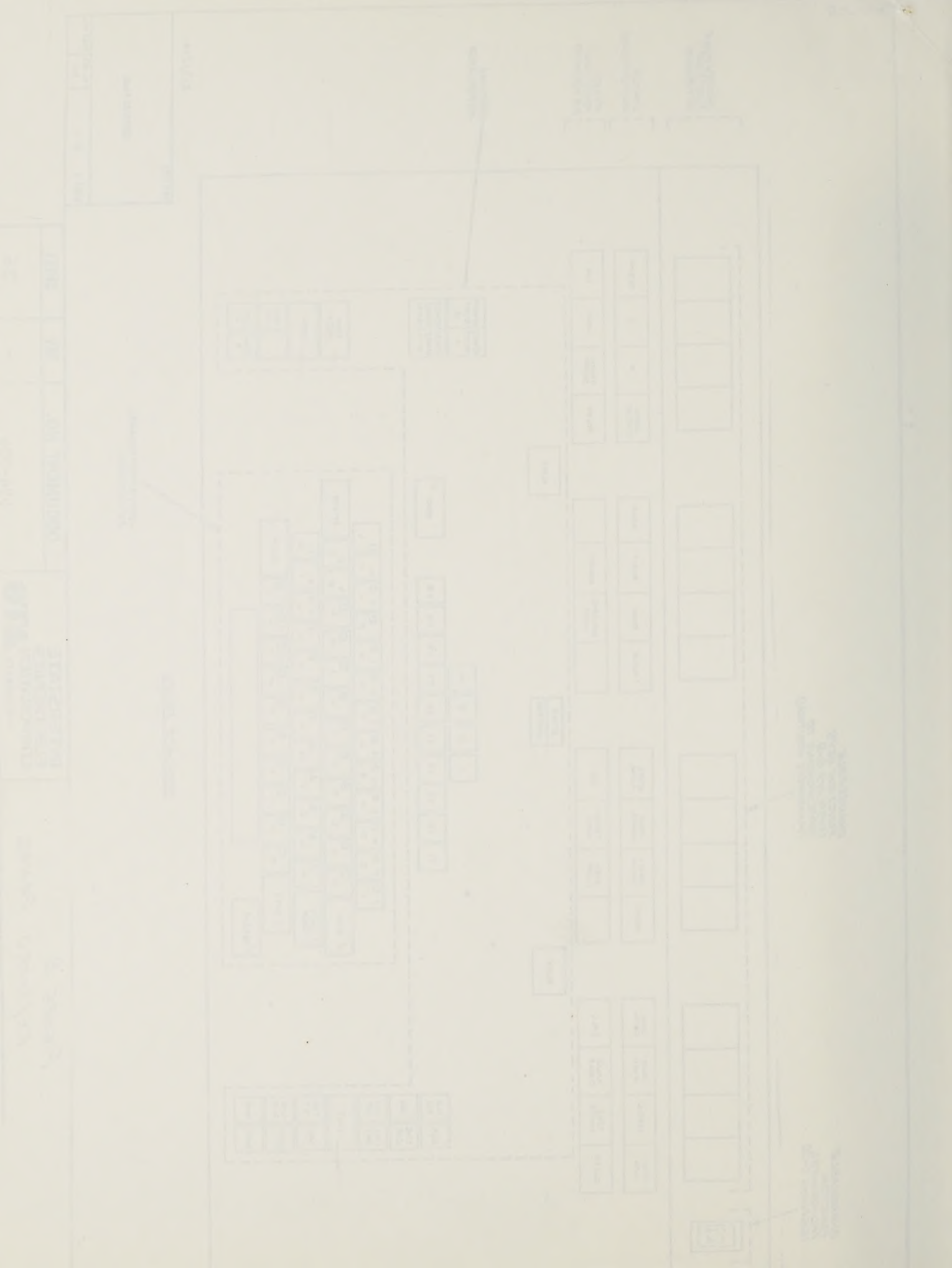

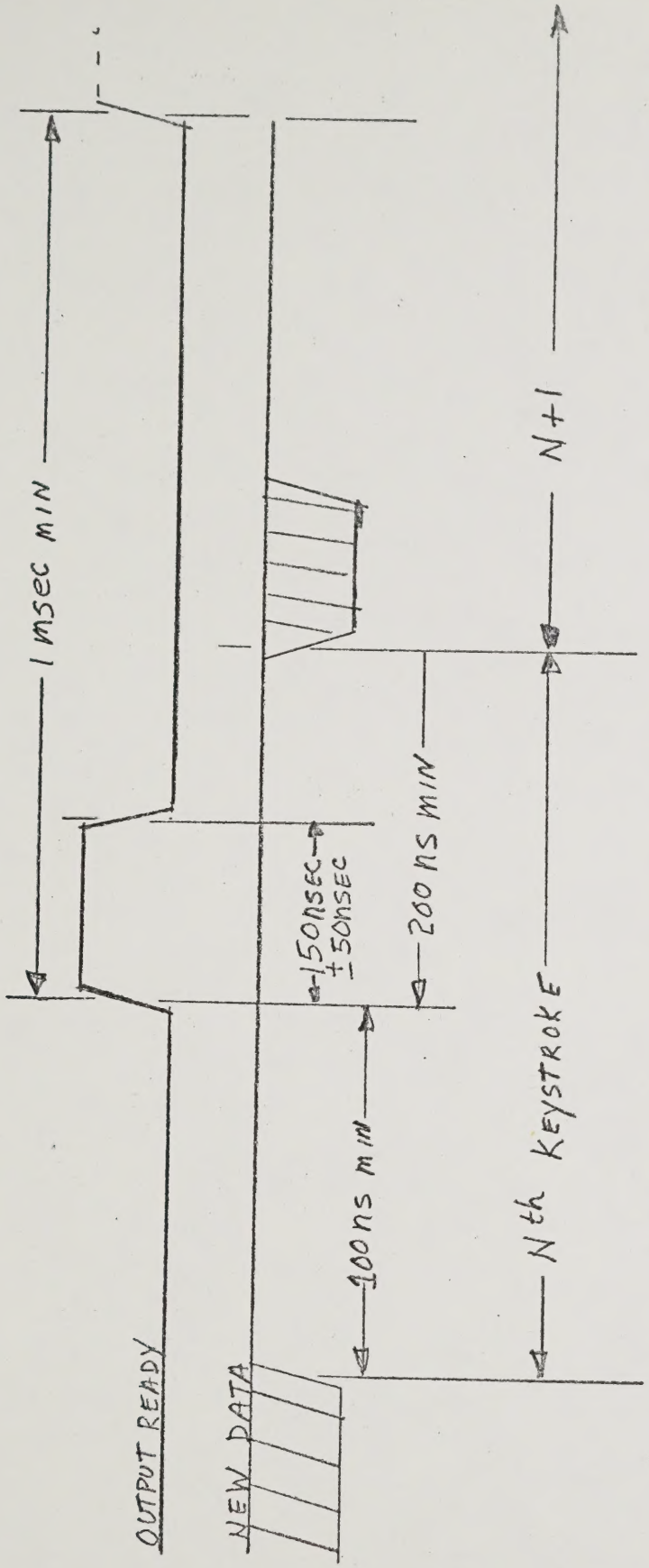

FIGURE C.
KEYBOARD TIMING

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